

GREEN TECH THE SERIES COLUMN FOR MAY 4, 2016

HEADLINE: CAN A HOME BE SUSTAINABLE AND RESILIENT?

The word sustainable, in reference to a home today, generally means a home built using sustainable methods, materials and facilitating green practices enabling a sustainable life style. The word resilient, in reference to a home, is designed to face nature's forces and be tough enough to handle our ever increasing climatic extremes. As, more and more, we come to accept what the green community as a whole has said for years; that we have a serious climate change issue worldwide. Addressing this seems to be finally accepted by the world at large, save a few who call this a natural process.

Natural disasters are reoccurring on a regular basis; the difference is the extremes that we now see. Canada is not exempt; our ice storm of 1998 affected 17% of our entire population and caused 2.5 billion dollars in damage. Out west, flooding from their rivers is a well-documented fact, not only the Red River in Manitoba. The 2013 flooding in southern Alberta was the worst on record. The Red Cross is still helping out in Alberta and expects to continue well into 2016. To date they have spent over 36 million dollars on this disaster alone.

Now we must address not only sustainability, but resiliency when we look at designing a home. This is the new subject amongst advanced builders and municipalities. The first step is the actual design and, with planet warming adding more water vapor in the atmosphere, resulting in an increasing number of deluges, building for extremes in rain and snow. Proper location of homes becomes a greater factor. Some areas now ban any building in a flood plan and some insurance companies will no longer insure in these areas.

The current rage is with the "tiny home" movement and, in fact, smaller homes have a side benefit. If power is lost for an extended period of time, smaller homes are easier to heat, especially if wood is the only heat source available. Maintaining a livable environment is created by a highly insulated building envelope to protect that valuable heat. Utilize design with respect to passive solar - orientation of the home to capture the sun and elimination of as many north and east windows as possible. Heat can be just as big an issue and designing in shutters, louvered window overhangs, awnings and porches are all factors to consider. The methods that make a home resilient are the ones that make it green.

So what does make the actual assembly of a home resilient? The home should be designed to generate all or some of its power. Cost of solar photovoltaic (PV)

panels and support systems has dropped significantly in the past few years. Attention to the durability of the structure, use of structural insulated panels (SIPS) and insulated concrete forms (ICF) are a good start. If you use wood, use the advanced frame methods and closed cell spray foam the entire structure. When I built our Spa last year, I used this wood frame/foam method and the cost of heating this winter, we expect will not exceed \$200. Not bad for an 860 sq. ft. building. Still with wood frame, attention to multiple tie-down methods, metal strapping, hurricane ties and hangers should be used. A company called Simpson Strong Tie makes a huge line of metal connectors and hangers. We used over a dozen different kinds of Simpson's connectors in the Spa building.

The days of conventional thermal pane windows is coming to an end. I can see where reinforced or impact resistant glass will be a common install. In some areas where high winds are not uncommon, with the extremes we now see, rolling shutter systems are being designed into more resilient homes.

Long term exterior cladding is vital, brick and cement fiber is not only strong, it's fire resistant, too. No siding should be considered unless it's got a 50 year warranty. We used wood shingles on the Spa. Not only do they look great, they are long lasting and a sustainably harvested product.

When it comes to the roof covering, metal is my only recommendation, unless you have a low slope roof. Not only is metal a good choice for fire and storm resistance, it's the ideal covering before solar panels are installed on a roof. The other consideration is rainwater harvesting. A metal roof does not deteriorate and contaminate your storage. While we are on rainwater harvesting, this is hand in hand with storm water management. Capturing water in a tank or cistern for a home reserve in case of a municipal interruption or power failure is now considered. Controlling storm water by means of a cistern can go hand in hand with reducing site erosion.

What is now popularly known as "Redundant Systems" refers to some manner of backup power for your home. These systems can also be used to charge the batteries in your solar PV system. The best generator system should be operated on propane or natural gas. Solar thermal systems, which provide for domestic hot water, can operate independently, if needed.

This idea of a sustainable/resilient home may seem a bit farfetched; maybe designed but not yet built. In fact, likely the most resilient home in North America is located about 130 miles north of Quebec City and has been lived in by Alain Hamel and his family for two years. The list of features of this home is extensive to say the least. The home was located for maximum passive solar, 91% of the

windows face south. Insulation levels at R83 for walls, concrete pad at R64 and the attic at a staggering R151. The roof is designed for double the local snow load. Once finished, the building was blower door tested and it exceeded the Passive House standards by 17%, a minimal 0.5 air changes per hour. There is an excellent article on line. Go to www.resilientdesign.org/the-most-resilient-home-in-north-america for more information.

Resilient design, coupled with sustainable assembly, is the next generation of homes. Our climate is dictating this.

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